Aviation-Climate Change Research Initiative (ACCRI)

Part
U.S. Government Procurements

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Description
The Volpe National Transportation System Center is issuing a Broad Agency Announcement (**BAA**) to solicit research proposals on a competitive basis to pursue ways to coordinate research activities relevant to quantifying the climate impacts of aviation for the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA). This procurement will be set aside 100% for small businesses. The NAICS code is 541710 with a size standard of 1,500 employees. The goal of this coordinated Aviation-Climate Change Research Initiative (ACCRI) is to improve the scientific understanding and modeling capability to assess aviation climate impacts and reduce key uncertainties associated with these impacts. . Direct questions electronically to Joel.Taylor@volpe.dot.gov.

The Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA) are jointly pursuing ways to coordinate research activities relevant to quantifying the climate impacts of aviation. The goal of this coordinated Aviation-Climate Change Research Initiative (ACCRI) is to improve the scientific understanding and modeling capability to assess aviation climate impacts and reduce key uncertainties associated with these impacts. The major tasks of ACCRI are sequential, with prior tasks setting direction and framing expectations for subsequent tasks.

The Volpe National Transportation Systems Center (Volpe Center) of the US Department of Transportation is providing support to implement the initial tasks of this research effort:

Task 1. Develop subject-specific white papers (SSWPs) on seven key areas providing a

focused, in-depth review of the present understanding of the scientific principles, uncertainties and gaps; and the present state of modeling capability based on the best current scientific knowledge for each. These seven key areas are listed below:

1. Transport and mixing in the upper troposphere (UT)/lower stratosphere (LS) region, their spatial and temporal variability;
2. Chemical processes relevant to modification of UT/LS ozone by aviation emissions;
3. Modeling and measurement capability to characterize water vapor supersaturation and temperature in the UT/LS region with aviation relevant spatial and temporal resolution;
4. Contrails and contrail-cirrus specific microphysics;
5. Climate impacts of contrails and contrail-cirrus;
6. Changes in chemical, microphysical and climate impacts of aircraft emissions due to flight rerouting (altitude and latitude); and
7. Metrics for comparison of climate impacts from well mixed greenhouse gases and inhomogeneous forcing such as those from UT/LS ozone, contrails, and contrail-cirrus.

Discussion of these seven key areas is requested in the Call for Proposals section below (one key area per proposal). The work under Task 1 is expected to start in August 2007. The draft and final reports for each subject shall be delivered by October 15, 2007, and December 31, 2007, respectively. The timeline for these draft reports is designed to inform critical policy and research decisions at FAA and NASA.

Task 2. Convene a select group of scientists to discuss and integrate the findings from all the white papers into a composite report on the research required to improve the state of knowledge. In addition, the report will also provide suggestions for designing scenarios for impact assessment computations using presently available best modeling tools and modules (and their integrations). The meeting, expected to last 4 days, will take place within the US during February 2008. All participants of Task 1 must attend and contribute towards preparation of the composite report of findings and recommendations. This report shall be completed by April 2008.

Call for Proposals

This online solicitation is a 100% Small Business Set-Aside open to all domestic researchers. Principle Investigators (PI) must submit their proposals via electronic mail by an authorized representative to Mr. Joel Taylor, Contract Specialist, at Joel.Taylor@volpe.dot.gov. All proposals must arrive by 11:59PM EST on July 9, 2007. **Also, any questions which may be submitted in connection with this Broad Agency Announcement must be received by the Government to Mr. Taylor no later than July 2, 2007.**

Instructions for Proposal Preparation

Individuals or teams may make proposals. Each proposal can only address one of the seven key areas described below, but individuals or teams may make more than one proposal. For teams making proposals, a PI must be identified, with any intended co-investigator(s) also identified in the proposal. Each proposal must have a title page clearly identifying its subject key area. The technical content of the proposal is limited to five pages (single space, 12 pt Times New Roman font), including references. Also, there must be a single page summarizing an estimate of hourly labor and cost for participating in the science meeting. Additional pages may be used to explain the costing as needed. Proposed individual/team funding for this task per theme may not exceed $50,000 on a Firm-Fixed-Price basis, including travel expenses to attend the science meeting in Task 2, which are estimated at $2,700 maximum per traveler There must be included a professional résumé with details on work experience and publication record.

Evaluation Criteria

Once all the proposals are in at the end of the solicitation period, the Government will convene a panel to make a selection of winning proposals. The selection panel will choose winning proposals based on the following selection criteria, listed in descending order of importance:

1. Technical merits of key area discussion (see below);
2. Researcher qualifications, including résumé, work experience, and publication record in the specific area; and
3. Proposed price.

Final proposal selection for award must be approved by the Contracting Officer.

Key Area Discussion

This Call for Proposals relates directly to the two tasks outlined above. In Task 1, contractors will develop SSWPs for seven aviation-focused key areas. An additional description of these seven areas and related sample questions is provided below. Please note that the sample questions are intended to provide perspective and focus on aviation and climate change. In any case, they are not intended to limit the scope and dimension of in-depth review that should be brought forward in order to assess the climate impacts of aviation. Wherever applicable, the relevance of a subject key area with other key areas should also be included. **PIs need not attempt to answer these questions in their proposals but must outline their intended approach to address them.**

1. Transport and mixing in the upper troposphere (UT)/lower stratosphere (LS) region, their spatial and temporal variability, including:
    i. Strat-trop exchange of air mass and air pollutants;
    ii. Long-range transport;
    iii. Convective transport, particularly in aviation flight corridors;
    iv. Subscale plume transport; and
    v. Dependence on model resolution within the UT/LS region to represent these transport processes within the context of scales associated with aviation induced perturbations.
2. Chemical processes relevant to modification of UT/LS ozone by aviation emissions. Sample questions include:
    i. How well do we model chemical composition of UT/LS region?
    ii. With what confidence we can isolate perturbations due to aviation emissions and their spatial and temporal variability?
    iii. How subscale processing of plume chemistry affects UT/LS chemical composition?
    iv. How well are aviation emissions characterized for cruise altitude conditions?
    v. How changing background atmosphere interacts with the chemical perturbation induced by aviation emissions?
3. Modeling and measurement capability to characterize water vapor supersaturation and temperature in the UT/LS region with aviation relevant spatial and temporal resolution.
4. Contrails and contrail-cirrus specific microphysics. Sample questions include:
    i. What are the range of conditions and uncertainties for formation of contrails, their persistence and evolution into cirrus?
    ii. What is our current understanding of possible past trends in contrail and cirrus coverage and their association with aviation traffic?
    iii. What are the chemical and microphysical mechanisms that determine the

evolution of emissions from the engine exit to plume dispersion?

iv. What is the role of emission characteristics and plume processes on the large-scale aviation impact?

v. How well aviation-related subscale processes are represented in large-scale global models?

vi. How well are aviation emissions characterized for cruise altitude conditions?

vii. How changing background atmosphere interacts with the microphysical perturbation induced by aviation emissions?

5. Climate impacts of contrails and contrail-cirrus. Sample questions include:

   i. Are there evidences that the optical properties of aviation induced contrails and cirrus may be different from naturally occurring cirrus?

   ii. What is the range of radiative forcing calculated for a given contrail coverage? What is the reason for the range?

   iii. What are the changing radiative properties of contrails during their atmospheric evolution and transformation into cirrus clouds?

6. What are the changes in chemical, microphysical and climate impacts of aircraft emissions due to flight rerouting (altitude and latitude)? Sample questions include:

   i. How variations in cruise altitude change the chemical and microphysical impact of aircraft emissions?

   ii. What are the chemical and microphysical mechanisms that determine the evolution of emissions from the engine exit to plume dispersion?

   iii. What is the role of emission characteristics and plume processes on the large-scale aviation impact?

   iv. What emissions at the exit plane are needed and what are the inputs needed for global models after the plume processing?

7. Metrics for comparison of climate impacts from well mixed greenhouse gases and inhomogeneous forcing such as those from UT/LS ozone, contrails, and contrail-cirrus. Sample questions:

   i. Which regions are strongly affected by aviation-induced perturbations?

   ii. To what extent global average forcing fully represents the regional

environmental impacts of short-lived greenhouse gases that have inhomogeneous forcing?

iii. What are the alternatives to represent global and regional impacts of aviation on the comparable scales?

iv. How much confidence can we place on prediction of regional climate changes?

v. With what level of certainty, regional climate impacts of aviation can be isolated? What are appropriate impacts to measure aviation climate impacts (i.e., warming, changes in precipitation, etc)?

vi. What confidence do we have in predicting the climate impacts of aviation under a different climate regime in 2025?

vii. What are the uncertainties associated with this expected climate shift?

viii. How to best represent the time integration of all aviation related radiative perturbations?

Again, for each key area listed above, proposals may be submitted by individual(s) or teams of science experts who are familiar with aviation-climate impact issues and are presently active in one or more of the seven key areas. Each proposal must address only one of the seven key areas. Individuals and institutions may submit proposals to more than one key area.

Deliverables and Period of Performance

Selected PIs should expect to begin work by August 2, 2007, and conclude the project by April 30, 2008. Required deliverables are:

Task	Deliverable	Format	Period of Performance
1	Subject-specific White Papers		
	• Draft	MS Word	• Draft: October 15, 2007
	• Final	MS Word	• Final: December 31, 2007
2	• Attendance at 4-day climate meeting		• Meeting: February 2008 (exact date and location TBD)
	• Composite report	MS Word	• Final Report: April 30, 2008